College of Engineering Education
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CE 602– HGE [Engr. Calaque, Dario Jr. A]

5th QUIZ
INSTRUCTIONS:
a. CHEATING IS PROHIBITED! Mind your own paper. Any act of cheating (using of cellular phones, books, and lecture materials during examination, copying answers from your seatmate, etc.) will result to failure of examination.
b. No borrowing of calculator.

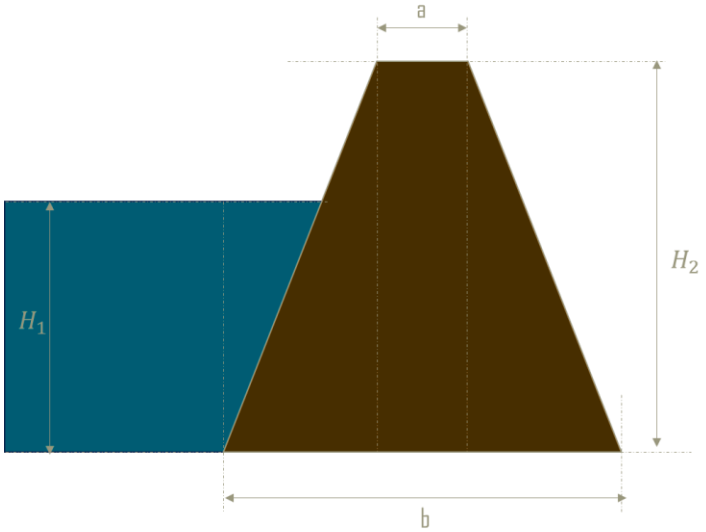
SIT 01. The earth dam shown is held in place by its own weight.

Dimensions:

a = 2m, b = 14m, $H_2 = 12m$, $\alpha = \beta$

Height of water, $H_1 = 9m$

Unit weight of soil is 17.3 KN/m^3



1. Determine the factor of safety against overturning.

a) 10.886

b) 13.256

c) 11.837

d) 12.589

2. The coefficient of friction at the base of the dam is 0.45. Solve for the factor of safety against sliding

a) 1.156

b) 1.786

c) 2.106

d) 2.543

3. Solve for the eccentricity of the resultant force at the base of the dam.

a) 0.053m

b) 0.076m

c) 0.098m

d) 0.044m

4. A bucket 200mm in diameter and 300mm in height is 2/3 full of water. It is swing on a vertical plane such that its bottom of the bucket describes a circle of radius of 1m. Determine the speed of rotation (in rpm) such that no water is spilled.

a) 31.5

b) 18.4

c) 25.6

d) 38.5

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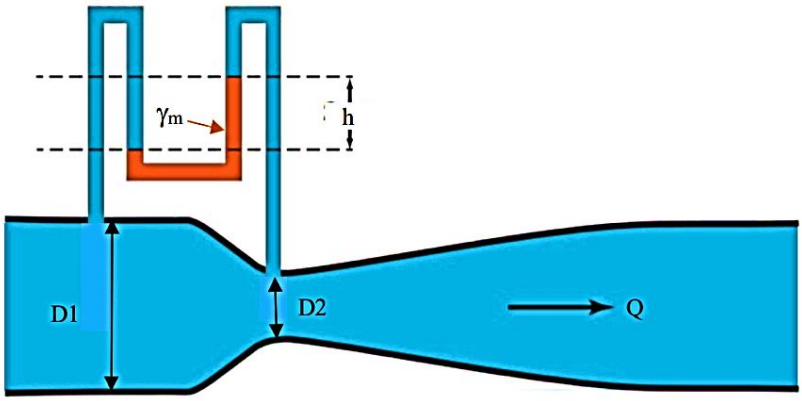
5. Water flows through a "D1" -in by "D2" -in Venturi meter at the rate of Q=1.49cfs and the differential gage is deflected "h" as shown. The specific gravity of the gage liquid is 1.25.



If D1 = 12*in* Ø, D2 = 6*in* Ø , h = 3.50ft, compute the coefficient of the meter.

a) 0.87

b) 0.98

c) 0.65

d) 0.77

SIT 02. An irrigation canal with trapezoidal cross-section has the following elements: Bottom width = 2.4m, depth of water = 0.90m, side slope = 1.5horizontal to 1 vertical, slope of canal bed = 0.001, coefficient of roughness = 0.025. The canal will serve clay-loam rice land.

6. What is the hydraulic radius in meters?

a) 0.487

b) 0.748

c) 0.632

d) 0.598

7. What is the mean velocity of flow in m/s?

a) 0.898

b) 0.956

c) 1.254

d) 1.085

8. If the canal will serve a clay-loam rice land, determine the area (in hectares) it can serve if the duty of water per hectare is 3L/s.

a) 1158

b) 958

c) 1010

d) 1254

SIT 03. Given the following data for three pipes in parallel:

Pipe 1: D1 = 450mm, L1 = 800mm

Pipe 2: D2 = 400mm, L2 = 700mm

Pipe 3: D3 = 500mm, L3 = 600mm

The total flow is 0.86cubic meters per second. Assuming f = 0.02 for all pipes, evaluate the following:

9. The flow in pipe 1 in m^3/s

a) 0.208

b) 0.261

c) 0.392

d) 0.356

10. The flow in pipe 2 in m^3/s

a) 0.261

b) 0.356

c) 0.208

d) 0.392

11. The flow in pipe 3 in m^3/s

a) 0.392

b) 0.208

c) 0.261

d) 0.356

SIT 04. A block of wood with length "h" and cross-sectional area "A" is submerged in water with 50mm exposed above the water surface. When submerged in a liquid with specific gravity of 1.35, it will float with 75mm exposed above the liquid surface.

12. Compute the specific gravity of the wood.

a) 0.752

b) 0.956

c) 0.524

d) 0.659

13. Obtain the length of the wood in mm.

a) 163.2

b) 124.8

c) 132.1

d) 146.4

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14. If the wood is submerged vertically in a liquid with specific gravity of 1.03, obtain the length of wood exposed above the surface in mm.

a) 62.1

b) 48.2

c) 52.8

d) 58.9

SIT 05. Water flows through a 100mm diameter orifice. The depth of water above the orifice center is 9m.

15. What is the theoretical discharge in m^3/s?

a) 0.104

b) 0.156

c) 0.951

d) 0.236

16. If the tank is going downward at an acceleration equal to one-half the acceleration due to gravity, what is the theoretical discharge in m^3/s?

a) 0.074

b) 0.128

c) 0.095

d) 0.110

17. If the coefficient of contraction is 0.64 and the coefficient of velocity is 0.98, what is the theoretical discharge in m^3/s?

a) 0.054

b) 0.075

c) 0.095

d) 0.067

18. A ship with vertical sides near the water line, weighs 40MN and draws 6.7m in salt water (sp.gr = 1.026). Discharge of 2MN of water ballast decreases the draft to 6.4m. What would be the draft of the ship in fresh water?

a) 6.854m

b) 6.632m

c) 6.458m

d) 6.548m

19. A vertical jet of water leaves the nozzle under a constant head of 25m and a diameter of 30mm. How high above the nozzle tip can it support a load of 300N?

a) 6.29m

b) 6.87m

c) 7.32m

d) 5.24m

20. In any stream flowing steadily without friction on the total energy contained is the same at every point in its path of flow. This principle is attributed to:

a) Archimedes

b) Boyles

c) Pascals

d) Bernoulli

21. The pressure exerted onto a liquid is transmitted equally and undiminished to all portions of the liquid. This principle in fluid mechanics is known as:

a) Archimedes

b) Bernoulli

c) Pascals

d) Boyles

22. An open cylindrical vessel having a height equal to its diameter is half-filled with water and rotated about its vertical axis at constant speed of 120rpm. Obtain the minimum diameter of the vessel to avoid spillage.

a) 0.652m

b) 0.497m

c) 0.561m

d) 0.371m

23. Water flows through a trapezoidal irrigation canal, 500mm deep, by 2m wide at the top by 1m wide at the bottom, with a mean velocity of 2m/s. Determine the rate of flow in m^3/minute.

a) 12.5

b) 90

c) 1.5

d) 105

24. Obtain the diameter of a pipe to carry 30 liters per second with a head loss of 0.5m in a length of 300m. The coefficient of friction is 0.025.

a) 0.385m

b) 0.257m

c) 0.315m

d) 0.235m

25. At what temperature (degrees Celsius) at which liquid water has the highest density?

a) 0

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b) 32

c) 100

d) 4

----------Nothing Follows----------